WATER RESOURCES REVIEW for

FEBRUARY

1973

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

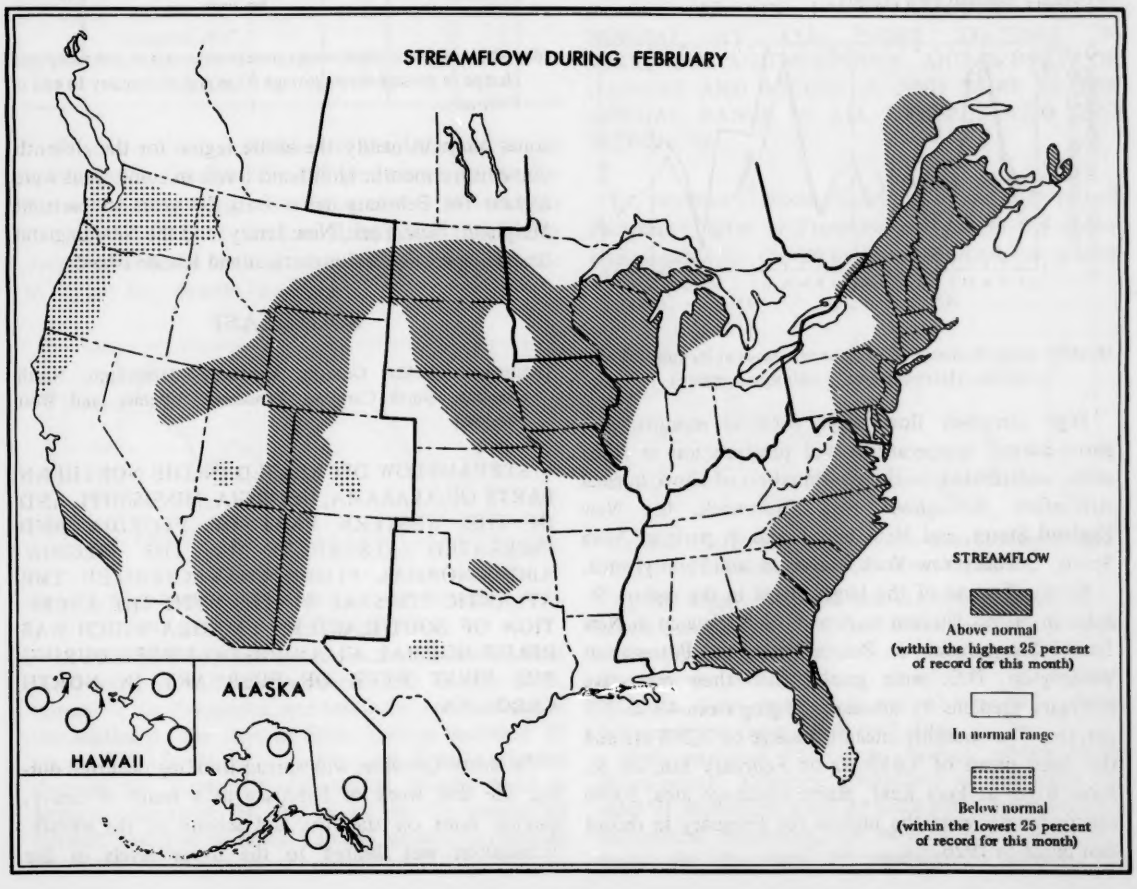
CANADA
DEPARTMENT OF THE ENVIRONMENT
WATER RESOURCES BRANCH

STREAMFLOW AND GROUND–WATER CONDITIONS

Streamflow generally increased in Quebec and the Atlantic Provinces of eastern Canada, and in parts of many east-coast, north-central, and southwestern States, and Hawaii, and decreased in other areas, including Alaska.

Above-normal streamflow conditions continued in much of the United States, but the areas of above-normal flow became larger in the Northeast and Southeast from January to February and smaller in the Midcontinent and the West. Flow of Mississippi River near Vicksburg, Mississippi, representing runoff from roughly 40 percent of conterminous United States, was 6 percent higher than during January and about 80 percent greater than the normal flow for the month. Moderate flooding occurred in North Carolina early in February.

Below-normal flows occurred in small areas of Florida, Texas, Colorado, and Utah, and a new large area of below-normal flow occurred in western Oregon and adjacent parts of California and Washington.



CONTENTS OF THIS ISSUE: Northeast, Southeast, Western Great Lakes region, Midcontinent, West, Alaska; Suspended-sediment discharge to the oceans from the United States; Usable contents of selected reservoirs near end of February 1973; Flow of large rivers during February 1973; Fluvial-sediment discharge to the oceans from the conterminous United States.

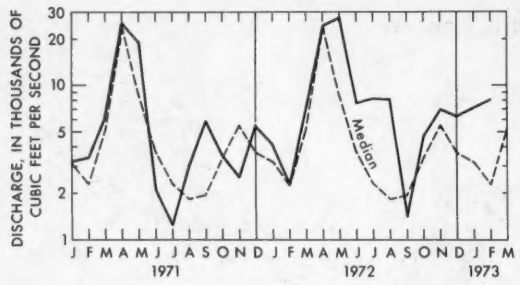
NORTHEAST

[Atlantic Provinces and Quebec; Delaware, Maryland, New York, New Jersey, Pennsylvania, and the New England States]

STREAMFLOW WAS IN OR ABOVE THE NORMAL RANGE IN ALL PARTS OF THE REGION. FLOWS INCREASED THROUGHOUT NOVA SCOTIA, MAINE, AND CONNECTICUT; AND IN EACH OF THE OTHER STATES AND PROVINCES, FLOW OF SOME STREAMS DECREASED AND SOME INCREASED.

In New Brunswick, the New England States, and New Jersey, streamflow was above the normal range at all index stations.

In eastern Quebec, monthly mean discharges of 8,050 cfs on St. Francois River at Hemming Falls and 10,260 cfs on Outardes River at Outardes Falls (drainage area, 7,230 square miles), were highest for February in records that began in 1926 at Hemming Falls and in 1922 at Outardes Falls. The flow of St. Francois River increased contraseasonally and was 3½ times the February median (see graph).

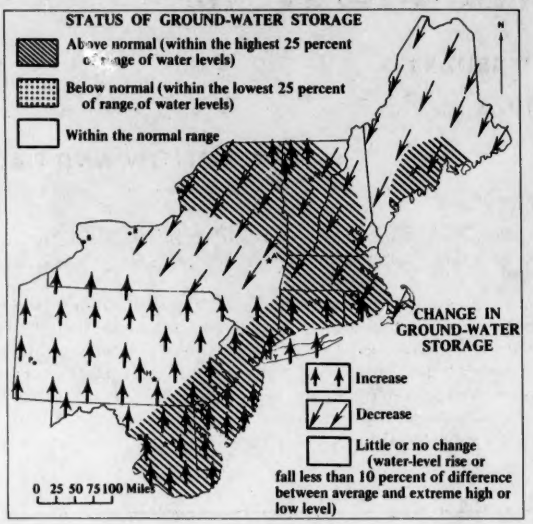


Monthly mean discharge of St. Francois River at Hemming Falls, Quebec (Drainage area, 3,660 square miles.)

High carryover flows from previous months, plus above-normal temperatures and precipitation in some areas, contributed to the continuation of above-normal streamflow throughout New Brunswick, the New England States, and New Jersey, and in parts of Nova Scotia, Quebec, New York, Maryland, and Pennsylvania.

Flows of some of the larger rivers in the region, St. John in Maine, Hudson in New York, Delaware in New Jersey, Susquehanna in Pennsylvania, and Potomac at Washington, D.C. were greater than their respective February medians by amounts ranging from 49 to 279 percent. The monthly mean discharge of 7,293 cfs and the daily mean of 9,850 cfs on February 8th, on St. John River at Fort Kent, Maine (drainage area, 5,690 square miles), were the highest for February in record that began in 1926.

Ground-water levels generally rose in the southern half of the region, including Maryland, New Jersey, and Pennsylvania, and declined in most of the northern half (see map). Levels remained in or above the normal sea-



Map above shows ground-water storage near end of February and change in ground-water storage from end of January to end of February.

sonal range in nearly the entire region for the eleventh consecutive month. Monthend levels in some wells were highest for February in at least 20 years in parts of Maryland, New York, New Jersey, and the New England States, especially in Connecticut and Rhode Island.

SOUTHEAST

[Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia]

STREAMFLOW DECREASED IN THE NORTHERN PARTS OF ALABAMA, GEORGIA, MISSISSIPPI, AND IN THE WESTERN PART OF FLORIDA AND INCREASED ELSEWHERE IN THE REGION. ABOVE-NORMAL FLOWS CHARACTERIZED THE ATLANTIC COASTAL STATES WITH THE EXCEPTION OF SOUTHEASTERN FLORIDA WHICH WAS BELOW NORMAL. FLOODING OCCURRED DURING THE FIRST WEEK OF FEBRUARY IN NORTH CAROLINA.

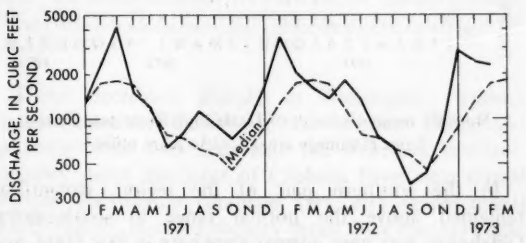
In North Carolina, widespread flooding occurred during the first week of February as a result of heavy, intense rains on the first and second of the month. Inundation was limited to the lower levels of the

overflow plains in most cases. Some local damage occurred in urban areas. At the index station, South Yadkin River at Mocksville, the monthly discharge of 736 cfs was the sixth highest for February, however, the daily discharge on the second was the maximum daily since record began (see listing below).

High flows of record for February were established on some streams in Virginia, North Carolina, South Carolina, and Georgia. Listed below are rivers with maximum monthly or daily flows for February:

Number	Station	Drainage (square miles)	Record began (year)	Monthly mean discharge	Daily mean discharge	Day
1-6675	Rapidan River near Culpeper, Va.	472	1931-	1,459	.....	...
2-0875	Neuse River near Clayton, N.C.	1,140	1927-	.....	14,900	4
2-1180	S. Yadkin River near Mocksville, N.C.	313	1938-	.....	4,850	2
2-1320	Lynches River at Effingham, S.C.	1,030	1929-	4,726	9,450	5
2-3175	Alapaha River at Statenville, Ga.	1,400	1930-	5,455	.....	...

The February mean discharge of the Alapaha River, in south central Georgia, was 457 percent of median for the month, a new high (see listing above). However, to the north, flow of Oconee River near Greensboro decreased and was in the normal range for the first time in the last four months (see graph).



Monthly mean discharge of Oconee River near Greensboro, Ga. (Drainage area, 1,090 square miles.)

In Florida, streamflow was above normal over most of the peninsular and northwestern parts of the State, normal in the Everglades, and below the normal range in the southeast. The flow of Silver Springs increased 20 cfs, to 720 cfs; 91 percent of normal. Flow southward through the Tamiami Canal outlets, 40-mile bend to Monroe, decreased 94 cfs, to 10 cfs; 31 percent of normal. The flow of Miami Canal at Miami decreased 38 cfs, to 95 cfs; 30 percent of normal.

Reservoir storage rose from last month in Tennessee, South Carolina, and part of Georgia and fell in North Carolina and Alabama.

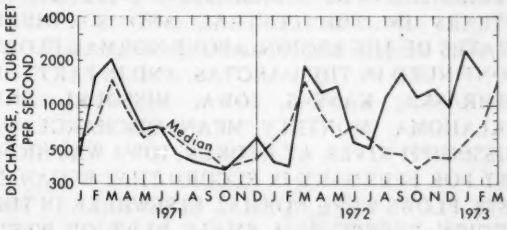
Ground-water levels rose in most of Alabama, North Carolina, West Virginia, western Kentucky, northeastern Florida, and in the Piedmont of Georgia; but declined in the Coastal Plain of North Carolina and in west-central and southeastern Florida. Levels rose also in the heavily pumped Brunswick and Savannah areas of coastal Georgia. Monthend levels were above average in North Carolina (in areas not affected by heavy pumping) and in western Kentucky, and in most of West Virginia, except in eastern and southeastern West Virginia where they declined. Monthend levels in southeastern Florida were within about 1 foot of average for end of February.

WESTERN GREAT LAKES

[Ontario; Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin]

STREAMFLOW INCREASED IN PARTS OF OHIO AND WISCONSIN, BUT DECREASED ELSEWHERE IN THE REGION. FLOWS REMAINED ABOVE NORMAL AT ALL INDEX STATIONS IN MINNESOTA AND WISCONSIN, AND IN PARTS OF ILLINOIS AND MICHIGAN, AND WERE IN THE NORMAL RANGE IN ALL OTHER STATES AND PROVINCES.

In northern Illinois, monthly mean discharge of Pecatonica River at Freeport remained in the above-normal range for the 6th consecutive month (see graph).



Monthly mean discharge of Pecatonica River at Freeport, Ill. (Drainage area, 1,330 square miles.)

In the Upper Peninsula and the northern part of the Lower Peninsula, in Michigan, streamflow also remained above the normal range. Ice cover on most streams in those areas was intact at monthend. In southern Michigan, flows returned to normal after five consecutive months in the above-normal range.

High carryover flows from January contributed to above-normal February streamflow in Wisconsin and most of Minnesota. Flow of Crow River at Rockford, in east-central Minnesota, has been in the above-normal range for the past 29 months. In northwestern

Wisconsin, flow at the index station, Jump River at Sheldon, decreased sharply but was 2½ times the February median and above the normal range for the 7th consecutive month. Flow in eastern Wisconsin increased slightly.

As a result of three consecutive years of abnormally high rainfall in the region, water level in Lake Erie now is slightly higher than at the time of the severe lakeshore flooding of last November 14–15 (reported in the November 1972 issue of *Water Resources Review* page 3), and at the highest level observed since records began in 1860, according to the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, and the U.S. Army, Corps of Engineers, Lake Survey.

Ground-water levels declined in water table wells, but remained near or above average in most of the region. The level in an observation well in the north-central part of Michigan's Lower Peninsula was highest for end-of-February in the 38 years of record. In heavily pumped artesian aquifers, levels were relatively unchanged in the Minneapolis-St. Paul, Minn., area and continued falling in the Milwaukee, Wisc., area. Levels remained below average in both areas.

MIDCONTINENT

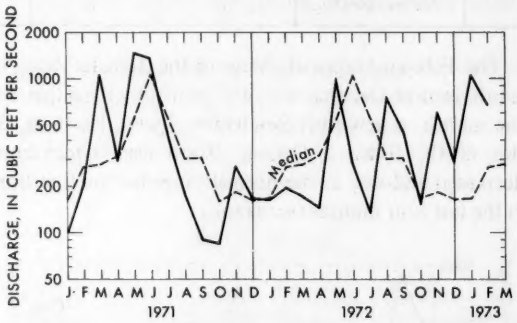
[Manitoba and Saskatchewan; Arkansas, Iowa, Kansas, Louisiana, Missouri, Nebraska, North Dakota, Oklahoma, South Dakota, and Texas]

STREAMFLOW GENERALLY INCREASED IN NORTH DAKOTA AND SOUTH DAKOTA, BUT DECREASED IN SOME BASINS AND INCREASED IN OTHERS IN THE CENTRAL AND SOUTHERN STATES OF THE REGION. ABOVE-NORMAL FLOWS CONTINUED IN THE DAKOTAS, AND IN PARTS OF NEBRASKA, KANSAS, IOWA, MISSOURI, AND OKLAHOMA. MONTHLY MEAN DISCHARGE OF MISSISSIPPI RIVER AT KEOKUK, IOWA WAS HIGHEST FOR FEBRUARY IN RECORD THAT BEGAN IN 1878. FLOWS WERE NORMAL ELSEWHERE IN THE REGION EXCEPT IN A SMALL PART OF WEST-CENTRAL TEXAS.

In North Dakota, above-normal temperatures continued through February, contributing to above-normal streamflow in most of the State. Snow cover at month-end consisted of about 1 inch in the extreme eastern part. Monthly mean flow of Cannonball River at Breien (drainage area, 4,100 square miles) was 349 cfs, more than 58 times the February median, and above the normal range for the 8th consecutive month. Flow of Bad River near Ft. Pierre, in South Dakota, continued to increase and the monthly mean discharge of 132 cfs was 213 times the median. Above-normal flows continued also in Iowa, where monthly mean discharge of Cedar River at Cedar Rapids, in the east, was 3d highest in 70 years of record, and monthly mean discharge of Mississippi River at Keokuk (drainage area, 119,000 square miles) was 92,900 cfs, highest for February in record that began in January 1878, and in Nebraska, where flow of Elkhorn River at Waterloo, in the northeast, has been in the above-normal range during 6 of the past 7 months.

In Missouri, high carryover flow from January, augmented by snowmelt runoff, resulted in continuation of above-normal streamflow in the area north of Missouri River. As a result of large releases from upstream mainstem reservoirs, for electric power generation, plus high rates of tributary inflow, the monthly mean discharge of Missouri River at Hermann, Missouri was nearly 3 times the February median.

In north-central Kansas and the adjacent part of south-central Nebraska, flow of Little Blue River decreased, following a sharp increase in January, but remained in the above-normal range for the 4th consecutive month (see graph). Cumulative runoff, as measured near Barnes, Kansas, has been roughly 2½ times the median for the first 5 months of the present water year.



Monthly mean discharge of Little Blue River near Barnes, Kans. (Drainage area, 3,330 square miles.)

In the southern part of the region, streamflow remained above the normal range in south-central Oklahoma, was near normal elsewhere in that State, and was in the normal range in Arkansas, Louisiana, and Texas, except in North Concho River near Carlsbad, in west-central Texas, where no flow has occurred since October 24, 1972. Total runoff for the present water year to date, has been 0.4 acre-feet. The median cumulative runoff, October through February, for the reference period 1931–60, is 1,420 acre-feet at that site.

At Baton Rouge, Louisiana, the flood threat on the Mississippi River did not materialize although peak flow was just less than that of a flood discharge. Flow was receding at monthend.

The level of Lake Winnipeg at Gimli, Manitoba, averaged 714.10 feet above mean sea level, 1.2 feet above the long-term mean for the month, and 1.72 foot below the maximum February mean level, observed in 1970.

Ground-water levels generally rose in water-table wells in Louisiana, Kansas, and Nebraska in areas not affected by heavy pumping; and declined in North Dakota. Monthend levels were near or above average in Iowa, Nebraska, and North Dakota, and below average in Louisiana. In east-central Arkansas, levels were unchanged. In the industrial aquifer of central and southern Arkansas (Sparta Sand), levels declined and were below average at Pine Bluff, and levels rose and were above average at El Dorado. In Texas, levels rose in the Edwards Limestone at Austin and San Antonio, and in the Evangeline aquifer at Houston; levels declined in the bolson deposits at El Paso. Monthend levels were above average at Austin and San Antonio, and lowest of record for February at El Paso and Houston.

WEST

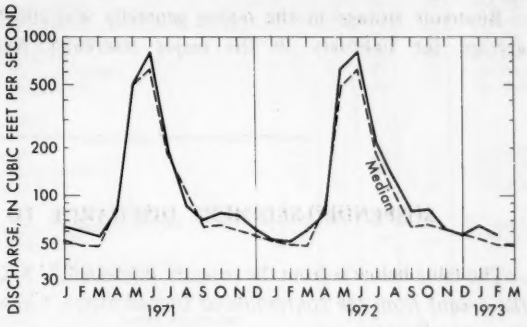
[Alberta and British Columbia; Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming]

STREAMFLOW DECREASED INTO THE BELOW-NORMAL RANGE IN WASHINGTON, WESTERN OREGON, AND NORTHWESTERN CALIFORNIA, INTO THE NORMAL RANGE IN PARTS OF SOUTHERN BRITISH COLUMBIA AND ALBERTA, AND IN NORTHERN MONTANA; AND REMAINED BELOW NORMAL IN CENTRAL COLORADO AND SOUTHWESTERN UTAH. FLOWS INCREASED IN NORTHERN NEVADA, SOUTHERN CALIFORNIA, AND THROUGHOUT ARIZONA AND NEW MEXICO. ABOVE-NORMAL FLOWS PERSISTED IN ARIZONA AND WYOMING, AND IN PARTS OF CALIFORNIA, COLORADO, IDAHO, NEW MEXICO, NEVADA, AND UTAH.

Flows decreased sharply in Washington, western Oregon, northern California, and northern Idaho, and generally were less than half the February medians. Monthly mean discharge of Chehalis River near Grand Mound, Washington (drainage area, 895 square miles) was 1,714 cfs, lowest February mean since records began in 1928, and 27 percent of the median. Monthly mean discharge at that station during January was 4,773 cfs. In western Oregon, monthly mean discharge of Wilson River near Tillamook decreased from 1,770 cfs in January to 565 cfs in February, only 24 percent of median. In northern California, flow of Smith River near Crescent City was less than half that recorded in January. Flows of the larger rivers in the region decreased from their January rates by amounts ranging from 5 percent on Salmon River at Whitebird, Idaho, to 67 percent on Willamette River at Salem, Oregon. By contrast, monthly mean flow of Arroyo Seco near Pasadena, in southern California, increased sharply from 6.62 cfs during January to 58.1 cfs during February, almost 7 times the February median. High rates of runoff also occurred in streams along the central California coast as a result of heavy precipitation during the first half of the month. Snowpack at higher elevations in the mountains is near or slightly above normal.

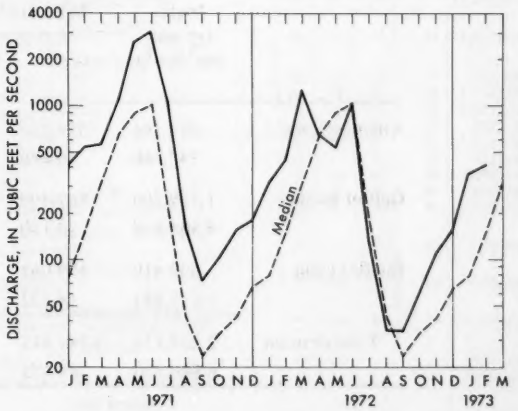
In Idaho, flow of Snake River near Heise was above normal, as it has been in 26 of the last 28 months. However, streamflow in relation to median declined statewide. Monthly mean discharge of Coeur d' Alene River at Enaville, in north Idaho, was the fourth lowest for February in 32 years of record. Snowpack in the mountains is below average.

In Wyoming, streamflow remained above the normal range throughout the State. Flow of Tongue River near Dayton, in the north, decreased seasonally but remained in the above-normal range (see graph). In northern



Monthly mean discharge of Tongue River near Dayton, Wyo.
(Drainage area, 204 square miles.)

Nevada, flow of Humboldt River at Palisade, increased seasonally and remained in the above-normal range for the sixth consecutive month (see graph). Flow of



Monthly mean discharge of Humboldt River at Palisade, Nev.
(Drainage area, 5,010 square miles.)

Yellowstone River, in southern Montana, decreased slightly but remained above normal for the ninth consecutive month. In Arizona, streamflow increased and was above the normal range in all parts of the State. Monthly mean discharges at the five index streamflow stations were roughly 3 to 9 times the February medians. Combined cumulative runoff at those stations since October 1, 1972 has been almost 7 times the median for that five-month period. In southwestern New Mexico, streamflow remained in the above-normal range, where it has been each month since August 1972. In Utah, streamflow generally remained above normal except in the southwest, where flow at the index station, Beaver River near Beaver has been below normal during most months since April 1972. Level of Great Salt Lake rose 0.40 foot during the month (to 4,199.45 feet above mean sea level) and was 0.65 foot higher than one year ago.

Reservoir storage in the region generally was above average for February in the major reservoirs. Net decrease in storage in the Colorado River Storage Project was 199,100 acre-feet.

Ground-water levels rose in northern and eastern Nevada; changed only slightly in southern parts of Idaho, California, and New Mexico; and declined in Montana and Washington. Monthend levels were above average in southern Idaho (except in the Rupert-Minidoka area); and near average in southern California and in Nevada, except in some heavily pumped areas. Levels near end of month were below average in Montana, Washington, and southern New Mexico.

ALASKA

Streamflow in Alaska continued in a normal winter recession but remained in the above-normal range in Little Susitna River and Chena River basins, in south-central and interior Alaska, respectively. Flows in south-eastern streams and on Kenai Peninsula were in the normal range.

SUSPENDED-SEDIMENT DISCHARGE TO THE OCEANS FROM THE UNITED STATES

The table below is from the recently published, U.S. Geological Survey Circular 670, *Fluvial-sediment discharge to the oceans from the conterminous United States.* Circular 670 is summarized on the back of this issue of the Water Resources Review.

Summary of suspended discharge to the oceans from the conterminous United States

[Upper numbers are English units; lower numbers are metric units]

	Drainage area (mi^2/km^2)	Water discharge		Suspended-sediment discharge			
		cfs/cms	Percent	Tons per year (short/metric)	Percent	Tons per mi^2/km^2	Milligrams per liter
Atlantic Ocean	287,166	359,350	20.6	14,204,000	2.9	49.5	40
	743,760	10,180	20.6	12,885,726	2.9	17.3	40
Gulf of Mexico	1,739,200	887,400	50.8	378,179,000	77.0	217.4	433
	4,504,528	25,120	50.8	343,080,207	77.0	76.1	433
Pacific Ocean	632,410	499,065	28.6	99,066,600	20.1	156.6	201
	1,637,942	14,132	28.6	89,872,229	20.1	54.9	201
Total or mean ..	2,658,776	1,745,815	100.0	491,449,600	100.0	184.8	286
	6,886,230	49,432	100.0	445,838,162	100.0	64.7	286

Provisional data; subject to revision

USABLE CONTENTS OF SELECTED RESERVOIRS NEAR END OF FEBRUARY 1973

[Contents are expressed in percent of reservoir capacity. The usable storage capacity of each reservoir is shown in the column headed "Normal maximum."]

Reservoir Principal uses: F–Flood control I–Irrigation M–Municipal P–Power R–Recreation W–Industrial	End of Jan. 1973	End of Feb. 1973	End of Feb. 1972	Average for end of Feb.	Normal maximum
	Percent of normal maximum				
NORTHEAST REGION					
NOVA SCOTIA					
Rossignol, Mulgrave, Falls Lake, St. Margaret's Bay, Black, and Ponhook Reservoirs (P)	66	72	43	57	223,400 (a)
QUEBEC					
Gouin (P)	59	51	32	53	6,487,000 ac-ft
Allard (P)	83	70	26	27	280,600 ac-ft
MAINE					
Seven reservoir systems (MP)	60	60	21	37	179,300 mcf
NEW HAMPSHIRE					
Lake Winnipesaukee (PR)	64	48	53	50	7,200 mcf
Lake Francis (FPR)	56	31	16	29	4,326 mcf
First Connecticut Lake (P)	42	22	16	17	3,330 mcf
VERMONT					
Somerset (P)	64	53	62	49	2,500 mcf
Harriman (P)	49	34	20	31	5,060 mcf
MASSACHUSETTS					
Cobble Mountain and Borden Brook (MP)	78	74	80	68	3,394 mcf
NEW YORK					
Great Sacandaga Lake (FPR)	60	44	42	35	34,270 mcf
Indian Lake (FMP)	48	34	50	40	4,500 mcf
New York City reservoir system (MW)	96	97	87	.....	547,500 mg
NEW JERSEY					
Wanaque (M)	101	97	95	78	27,730 mg
PENNSYLVANIA					
Wallenpaupack (P)	58	48	72	49	6,875 mcf
Pymatuning (FMR)	77	76	78	86	8,191 mcf
MARYLAND					
Baltimore municipal system (M)	102	100	101	87	85,340 mg
SOUTHEAST REGION					
NORTH CAROLINA					
Bridgewater (Lake James) (P)	90	89	79	83	12,580 mcf
High Rock Lake (P)	96	70	65	79	10,230 mcf
Narrows (Badin Lake) (P)	97	97	92	102	5,616 mcf
SOUTH CAROLINA					
Lake Murray (P)	80	82	82	67	70,300 mcf
Lakes Marion and Moultrie (P)	88	91	89	73	81,100 mcf
SOUTH CAROLINA--GEORGIA					
Clark Hill (FP)	70	69	69	63	75,360 mcf
GEORGIA					
Burton (PR)	81	89	76	67	104,000 ac-ft
Lake Sidney Lanier (FMPR)	59	60	60	55	1,686,000 ac-ft
Sinclair (MPR)	95	88	90	85	214,000 ac-ft
ALABAMA					
Lake Martin (P)	83	82	90	75	1,373,000 ac-ft
TENNESSEE VALLEY					
Clinch Projects: Norris and Melton Hill Lakes (FPR)	36	44	55	35	1,560,000 cfsd
Holston Projects: South Holston, Watauga, Boone, Fort Patrick Henry, and Cherokee Lakes (FPR)	46	49	58	39	1,452,000 cfsd
Douglas Lake (FPR)	13	19	28	23	703,100 cfsd
Hiwassee Projects: Chatuge, Nottely, Hiwassee, Apalachia, Blue Ridge, Ocoee 3, and Parksville Lakes (FPR)	49	53	61	49	512,200 cfsd
Little Tennessee Projects: Nantahala, Thorpe, Fontana, and Chilhowee Lakes (FPR)	53	56	60	46	745,200 cfsd
WESTERN GREAT LAKES REGION					
WISCONSIN					
Chippewa and Flambeau (PR)	52	36	32	22	15,900 mcf
Wisconsin River (21 reservoirs) (PR)	56	29	20	15	17,400 mcf
MINNESOTA					
Mississippi River headwater system (FMR)	19	16	21	18	1,640,000 ac-ft
MIDCONTINENT REGION					
NORTH DAKOTA					
Lake Sakakawea (Garrison) (FIPR)	90	88	84	.....	22,640,000 ac-ft
NEBRASKA					
Lake McConaughy (IP)	80	82	88	73	1,948,000 ac-ft
OKLAHOMA					
Keystone (FPR)	106	98	87	87	661,000 ac-ft
Lake O' The Cherokees (FPR)	109	94	83	77	1,492,000 ac-ft
Tenkiller Ferry (FPR)	112	104	91	83	628,200 ac-ft
Lake Altus (FIMR)	12	14	22	52	134,500 ac-ft
Eufaula (FPR)	103	98	80	78	2,378,000 ac-ft
OKLAHOMA--TEXAS					
Lake Texoma (FMPRW)	95	101	86	85	2,722,000 ac-ft
TEXAS					
Possum Kingdom (IMPRW)	90	91	94	75	724,500 ac-ft
Buchanan (IMPW)	73	73	95	77	955,200 ac-ft
Bridgeport (IMW)	52	54	62	59	270,900 ac-ft
Eagle Mountain (IMW)	92	94	96	87	182,700 ac-ft
Medina Lake (I)	94	94	98	46	254,000 ac-ft
Lake Travis (FIMPRW)	99	102	97	79	1,144,000 ac-ft
Lake Kemp (IMW)	43	42	28	53	461,800 ac-ft
THE WEST					
ALBERTA					
Spray (P)	67	55	35	32	210,000 ac-ft
Lake Minnewanka (P)	66	55	50	42	199,700 ac-ft
St. Mary (I)	70	70	72	64	320,800 ac-ft
WASHINGTON					
Franklin D. Roosevelt Lake (IP)	94	73	51	64	5,232,000 ac-ft
Lake Chelan (PR)	36	21	19	36	676,100 ac-ft
IDAHO--WYOMING					
Upper Snake River (7 reservoirs) (IMP)	73	73	76	73	4,282,000 ac-ft
WYOMING					
Pathfinder, Seminoe, Alcova, Kortes, and Glendo Reservoirs (I)	65	66	72	35	3,016,000 ac-ft
Buffalo Bill (IP)	67	61	59	63	421,300 ac-ft
Boysen (FIP)	67	64	75	65	802,000 ac-ft
Keyhole (F)	84	84	79	33	199,900 ac-ft
COLORADO					
John Martin (FIR)	4	5	7	20	364,400 ac-ft
Colorado–Big Thompson project (I)	72	73	75	53	722,600 ac-ft
Taylor Park (IR)	36	37	64	56	106,000 ac-ft
COLORADO RIVER STORAGE PROJECT					
Lake Powell; Flaming Gorge, Navajo, and Blue Mesa Reservoirs (IFPR)	53	52	54	.....	31,276,500 ac-ft
UTAH--IDAHO					
Bear Lake (IPR)	78	77	76	55	1,421,000 ac-ft
CALIFORNIA					
Hetch Hetchy (MP)	29	22	18	27	360,400 ac-ft
Lake Almanor (P)	66	64	60	45	1,036,000 ac-ft
Shasta Lake (FIPR)	76	77	83	74	4,377,000 ac-ft
Millerton Lake (FI)	78	85	66	63	503,200 ac-ft
Pine Flat (FI)	38	46	45	53	1,014,000 ac-ft
Isabella (FIR)	12	14	21	25	351,800 ac-ft
Folsom (FIP)	60	60	61	58	1,000,000 ac-ft
Lake Berryessa (FIMW)	88	97	87	86	1,600,000 ac-ft
Clair Engle Lake (Lewiston) (P)	83	86	87	83	2,438,000 ac-ft
CALIFORNIA--NEVADA					
Lake Tahoe (IPR)	69	73	70	53	744,600 ac-ft
NEVADA					
Rye Patch (I)	82	88	102	48	179,100 ac-ft
ARIZONA--NEVADA					
Lake Mead and Lake Mohave (FIMP)	75	76	69	63	27,970,000 ac-ft
ARIZONA					
San Carlos (IP)	43	54	13	18	948,600 ac-ft
Salt and Verde River system (IMPR)	72	84	50	41	2,073,000 ac-ft
NEW MEXICO					
Conchas (FIR)	62	63	44	77	352,600 ac-ft
Elephant Butte and Caballo (FIPR)	16	18	11	29	2,539,000 ac-ft

[a] Thousands of kilowatt-hours.

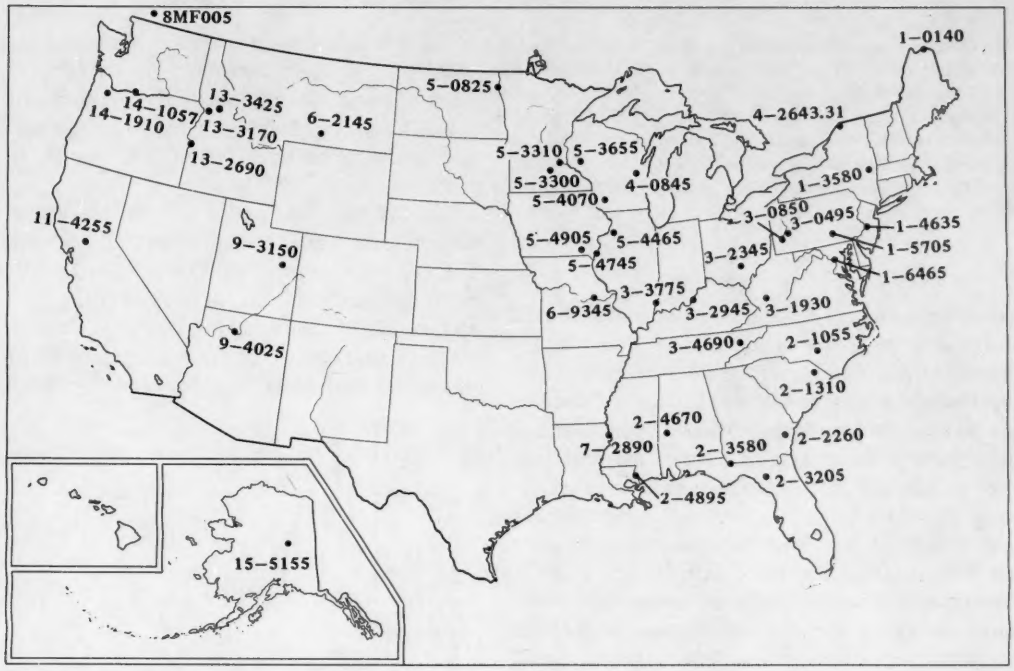
Provisional data; subject to revision

FLOW OF LARGE RIVERS DURING FEBRUARY 1973

Station number	Stream and place of determination	Drainage area (square miles)	Mean annual discharge through September 1970 (cfs)	February 1973					
				Monthly discharge (cfs)	Percent of median monthly, discharge[1]	Change in discharge from previous month (percent)	Discharge near end of month		
							(cfs)	(mgd)	Date
1–0140	St. John River below Fish River at Fort Kent, Maine.	5,690	9,397	7,293	379	+68	5,7000	3,680	28
1–3580	Hudson River at Green Island, N.Y.	8,090	12,520	20,280	168	-23	.....	.....	....
1–4635	Delaware River at Trenton, N.J	6,780	11,360	18,825	177	-5	7,550	4,880	28
1–5705	Susquehanna River at Harrisburg, Pa.	24,100	33,670	54,510	149	+20	19,000	12,300	28
1–6465	Potomac River near Washington, D.C.	11,560	[2] 10,640	24,500	175	+49	10,100	6,530	28
2–1055	Cape Fear River at William O. Huske Lock near Tarheel, N.C.	4,810	4,847	17,500	130	+82	5,500	3,550	26
2–1310	Pee Dee River at Peedee, S.C	8,830	9,098	33,900	252	+103	16,100	10,400	25
2–2260	Altamaha River at Doctortown, Ga.	13,600	13,380	47,460	251	+64	53,000	34,300	21
2–3205	Suwannee River at Branford, Fla	7,740	6,775	13,660	176	+185	19,600	12,700	24
2–3580	Apalachicola River at Chattahoochee, Fla.	17,200	21,690	59,100	199	+36	35,600	23,000	27
2–4670	Tombigbee River at Demopolis lock and dam near Coatopa, Ala.	15,400	21,700	52,650	113	-28	27,300	17,600	26
2–4895	Pearl River near Bogalusa, La	6,630	8,533	21,420	142	-25	14,200	9,180	28
3–0495	Allegheny River at Natrona, Pa	11,410	[2] 18,700	22,270	80	+9	12,400	8,010	26
3–0850	Monongahela River at Braddock, Pa.	7,337	[2] 11,950	19,520	109	+66	7,800	5,040	26
3–1930	Kanawha River at Kanawha Falls, W.Va.	8,367	12,370	22,220	113	+139	9,740	6,290	25
3–2345	Scioto River at Higby, Ohio	5,131	4,337	6,535	85	-7	3,120	2,020	26
3–2945	Ohio River at Louisville, Ky[3]	91,170	110,600	170,200	93	+36	95,900	62,000	25
3–3775	Wabash River at Mount Carmel, Ill.	28,600	26,310	38,250	115	-31	21,800	14,100	28
3–4690	French Broad River below Douglas Dam, Tenn.	4,543	[2] 6,528	12,040	114	+34	.....	.....	....
4–0845	Fox River at Rapide Croche Dam, near Wrightstown, Wis.[3]	6,150	4,142	7,800	216	+22	.....	.....	....
4–2643.31	St. Lawrence River at Cornwall, Ontario–near Massena, N.Y.[4]	299,000	239,100	279,000	123	+11	295,000	191,000	28
5–0825	Red River of the North at Grand Forks N. Dak.	30,100	2,439	1,298	177	+10	1,300	840	28
5–3300	Minnesota River near Jordan, Minn ..	16,200	3,306	2,158	404	+16	1,970	1,270	28
5–3310	Mississippi River at St. Paul, Minn ...	36,800	[2] 10,230	7,664	179	-6	6,590	4,260	27
5–3655	Chippewa River at Chippewa Falls, Wis.	5,600	5,062	4,412	151	-10	.....	.....	....
5–4070	Wisconsin River at Muscoda, Wis	10,300	8,457	10,464	172	-13	.....	.....	....
5–4465	Rock River near Joslin, Ill	9,520	5,288	7,670	158	-59	9,020	5,830	28
5–4745	Mississippi River at Keokuk, Iowa ...	119,000	61,210	92,900	232	-12	78,000	50,400	28
5–4905	Des Moines River at Keosauqua, Iowa.	14,038	5,220	16,600	522	+61	16,800	10,900	28
6–2145	Yellowstone River at Billings, Mont.	11,795	6,754	3,060	115	-3	3,520	2,270	27
6–9345	Missouri River at Hermann, Mo	528,200	78,480	133,200	291	+4	83,800	54,200	25
7–2890	Mississippi River near Vicksburg, Miss.[5]	1,144,500	552,700	1,166,000	179	+6	1,113,000	719,000	26
9–3150	Green River at Green River, Utah ...	40,600	6,369	2,600	110	+12	4,030	2,600	21
9–4025	Colorado River near Grand Canyon, Ariz.	137,800	.....	15,410	.....	-21	.....	.....	....
11–4255	Sacramento River at Verona, Calif ...	21,257	18,370	45,390	119	-43	52,000	33,600	23
13–2690	Snake River at Weiser, Idaho	69,200	17,670	20,200	111	-15	19,900	12,900	26
13–3170	Salmon River at White Bird, Idaho ..	13,550	11,060	4,060	90	-5	4,120	2,660	26
13–3425	Clearwater River at Spalding, Idaho ..	9,570	15,320	3,380	37	-63	3,250	2,100	26
14–1057	Columbia River at The Dalles, Oreg.[6]	237,000	194,000	139,500	110	-8	.....	.....	....
14–1910	Willamette River at Salem, Oreg	7,280	23,370	12,400	28	-67	10,600	6,850	28
15–5155	Tanana River at Nenana, Alaska	27,500	24,040	5,410	87	-3	5,200	3,360	28
8MF005	Fraser River at Hope, British Columbia.	78,300	95,300	30,100	101	-14	32,900	21,300	27

[1] Reference period 1931–60 or 1941–70.
[2] Adjusted.
[3] Record furnished by Corps of Engineers.
[4] Record furnished by Buffalo district, Corps of Engineers, through International St. Lawrence River Board of Control. Discharges shown are considered to be the same as discharge at Ogdensburg, N.Y. when adjusted for storage in Lake St. Lawrence.
[5] Records of daily discharge computed jointly by Corps of Engineers and Geological Survey.
[6] Discharge determined from information furnished by Bureau of Reclamation, Corps of Engineers, and Geological Survey.

SELECTED STREAM-GAGING STATIONS ON LARGE RIVERS



Location of stream-gaging stations on large rivers listed in table on page 8.

WATER RESOURCES REVIEW **FEBRUARY 1973**

Cover map shows generalized pattern of streamflow for February based on 22 index stream-gaging stations in Canada and 130 index stations in the United States. Alaska and Hawaii inset maps show streamflow only at the index gaging stations which are located near the points shown by the arrows.

Streamflow for February 1973 is compared with flow for February in the 30-year reference period 1931–60 or 1941–70. Streamflow is considered to be *below normal* if it is within the range of the low flows that have occurred 25 percent of the time (below the lower quartile) during the reference period. Flow for February is considered to be *above normal* if it is within the range of the high flows that have occurred 25 percent of the time (above the upper quartile).

Flow higher than the lower quartile but lower than the upper quartile is described as being within the *normal range.* In the Water Resources Review *normal flow* is defined as the median of the 30 flows of February during the reference period. The normal (median) has been obtained by ranking those 30 flows in their order of magnitude; the highest flow is number 1, the lowest flow is number 30, and the average of the 15th and 16th highest flows is the normal (median).

The normal is an average (but not an arithmetic average) or middle value; half of the time you would expect the February flows to be below the median and half of the time to be above the median. Shorter reference periods are used for the Alaska index stations because of the limited records available.

Statements about *ground-water levels* refer to conditions near the end of February. Water level in each key observation well is compared with average level for the end of February determined from the entire past record for that well or from a 20-year reference period, 1951–70. *Changes in ground-water levels,* unless described otherwise, are from the end of January to the end of February.

The Water Resources Review is published monthly. Special-purpose and summary issues are also published. In the United States, issues of the Review are free on application to the Water Resources Review, U.S. Geological Survey, Washington, D.C. 20244.

This issue was prepared by J.C. Kammerer, H.D. Brice, E.W. Coffay, and L.C. Fleshmon from reports of the field offices, March 9, 1973.

FLUVIAL-SEDIMENT DISCHARGE TO THE OCEANS FROM THE CONTERMINOUS UNITED STATES

The accompanying summary and graph are from the report, *Fluvial-sediment discharge to the oceans from the conterminous United States,* by W.F. Curtis, J.K. Culbertson, and E.B. Chase: U.S. Geological Survey Circular 670, 17 pages, 1973; a contribution to the International Hydrologic Decade. A copy of Circular 670 may be obtained free on request to U.S. Geological Survey, Branch of Distribution, 1200 S. Eads St., Arlington, Va. 22202.

SUMMARY

Suspended-sediment discharge data obtained from 27 drainage areas during the period 1950–69 were used to estimate the sediment contributed to the oceans from the conterminous United States. The data are based on suspended-sediment samples obtained with standard United States depth-integrating samplers and, therefore, do not include that part of the total sediment discharge moving as bedload. The quantity of sediment transported as bedload may be estimated at about 10 percent of the sediment transported in suspension.

The amount of sediment discharged each day into the Atlantic and Pacific Oceans is 38,915 tons and 271,400 tons, respectively. The Gulf of Mexico receives about three times more sediment than both of these areas, a total of 1,037,000 tons each day. A more pictorial way of expressing these figures is to transport this sediment discharge by train (a boxcar is equivalent to 100,000 pounds or 50 tons). Each day of the year it would take a train of 778 boxcars to transport the suspended-sediment discharged to the Atlantic Ocean and 5,428 boxcars to transport the Pacific Coast sediment; to move the Gulf of Mexico sediment, it would take a daily train 20,740 boxcars long.

Average yearly sediment yields range from 49.5 tons per square mile for the Atlantic Ocean drainage area to 217.4 tons per square mile for the Gulf of Mexico drainage area; the Pacific Ocean drainage area falls into the middle with 156.6 tons per square mile. The mean for the entire conterminous United States (excluding the Great Lakes drainage area) is 184.8 tons per square mile. However, yields computed on the basis of total drainage area can be deceiving because good land-use practices and multiple reservoirs in the drainage area can dramatically reduce the amount of sediment delivered to the sea. The Colorado River drainage basin is a good example. The yield of the station Colorado River at Yuma, Ariz., was reduced from 234,600,000 tons (966 tons per square mile) during the period 1911-16 to 152,600 tons (0.63 ton per square mile) during the period 1965–67; see figure 1.

Concentrations of suspended sediment range from about 15 mg/l along the southern part of the Atlantic Coast to over 1,600 mg/l along the southern part of the Pacific Coast. The Gulf Coast region has the most drainage basins with the lowest (15 mg/l) sediment concentration.

The amount of suspended sediment discharged to the oceans from the conterminous United States is 491,449,600 tons per year. If this amount was deposited in Washington, D.C., on the mall between the Capitol and the Lincoln Memorial (an area 11,000 feet long and 600 feet wide), it would reach a depth of about 1,400 feet or 2½ times as high as the Washington Monument.

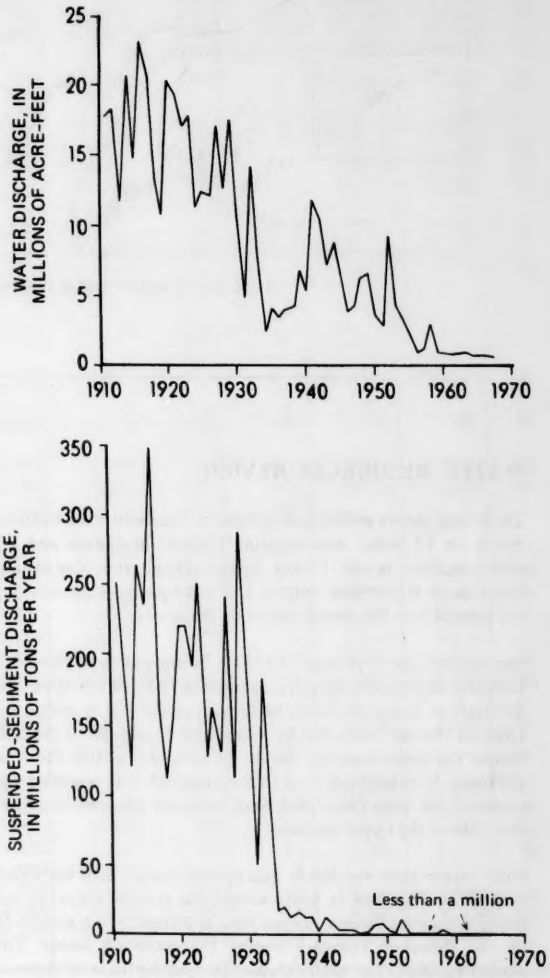


Figure 1.—Water discharge and suspended-sediment discharge for the Colorado River at Yuma, Ariz., 1911–67.

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